

THE
NEWTONIAN Philosophy
COMPARED
With *That* of LEIBNITZ.

Translated from the FRENCH of
M. DE VOLTAIRE.

16. [single wks.]

GLASGOW:
Printed for ROBERT URIE,
MDCCLXIV.



TO THE
 MARCHIONESS
 OF
 CHASTELLET.

MADAM,

THE first time I placed your respectable name at the head of this small piece of philosophy, we studied together; but you have since taken a flight I am no longer able to follow. My case, therefore, is now like a grammarian, dedicating a treatise of rhetoric to a Demosthenes or a Cicero. I am offering simple elements to a person, who has penetrat-

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ed all the depths of the higher geometry, and who alone among us has translated, and written comments on, the great Newton.

That philosopher in his life-time reaped all the glory he deserved. He excited no envy, as he could have no rival. The learned world were his disciples; and others admired, without presuming to understand him. But the honour done him by you, is certainly the greatest he ever received. I am at a loss which to admire most, Newton, the inventor of the Fluxionary calculus, who discovered new laws in nature, and anatomized light; or you, Madam, who amidst the dissipation annexed to your condition, are so well acquainted with all his discoveries. Those who see you at court will hardly look upon you as a com-

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mentator on philosophy; and the learned, who are learned enough to read your writings, will still less conceive, that you can stoop to transitory amusements, with the same ease you soar to the most sublime truths. This easiness and simplicity, ever highly valuable, but so rarely joined with talents and science, will at least procure pardon for your merit. This is, in general, all that can be hoped from persons with whom we converse; but the small number of superior geniuses, who have applied themselves to the same studies, will conceive the highest veneration for you, and posterity will look on you with astonishment. That persons of your sex have reigned gloriously over large empires does not surprize me. A woman, with a wise council, may

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rule like an Augustus: but to penetrate, with indefatigable labour, truths which intimidate most persons to approach; to display, in hours of leisure, what the greatest philosophers are incessantly studying, is a gift, Madam, peculiar to yourself, and exhibits a patern that will be very rarely intimated, etc.

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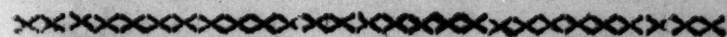
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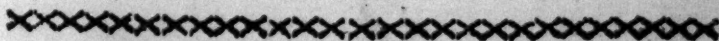


T H E

NEWTONIAN PHILOSOPHY

COMPARED

With *That* of LEIBNITZ.



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THE

NEWTONIAN PHILOSOPHY

CONTAINED

IN THE

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T H E
NEWTONIAN Philosophy

C O M P A R E D

With *That* of LEIBNITZ.

C H A P. I.

O F G O D.

Reasons which every person does not approve.

Reasons of the Materialists.

NEWTON was fully persuaded of the existence of a God, and by that term understood not only an infinite, almighty, eternal, creative Being; but a Master, who had established a relation between himself and his creatures; as without this relation, the knowledge of God is only a barren idea, which would seem to invite every rea-

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soner of a perverse mind, to the practice of vice, by the hopes of impunity.

Accordingly, that great philosopher, at the end of his *Principia*, makes a singular remark, namely, that we do not say, my eternal, my infinite, because these attributes do not at all relate to our nature; but we say, and it is our duty to say, *My God*; and are thereby to understand the master and preserver of our life, the object of our thoughts. I remember, that in several conversations I had in 1726, with Dr. Clarke, that philosopher never mentioned the name of God, but with a remarkable air of recollection and respect; and when I owned to him, how much it affected me, he said he had insensibly from Newton acquired that custom, which should indeed be the custom of every man. Newton's whole philosophy necessarily leads to the knowledge of a supreme Being, who has freely created and arranged all things. For, if the world be finite; if there be a vacuum, the existence of matter is not necessary; and therefore has received existence from a free cause. If matter gravitates, as we know it does from demonstration, it does not appear to gravitate from its nature, as it is extended by its nature; it has therefore received its gravitation from God. If the planets, in

a space void of resistance, revolve one way rather than another, the hand of their Creator must have directed their course that way, with an absolute freedom.

The imaginary physical principles of Descartes are very far from leading the mind in this manner to the knowledge of its Creator. God forbid that I should be guilty of so horrid a slander, as to charge that great man with disowning the supreme Intelligence to which he was so highly indebted, and which had raised him above almost all the men of his age. I only say, that the abuse he has sometimes made of his genius, has led his followers to principles, from which their master kept himself at a great distance. I say, the Cartesian system has produced that of Spinoza: I say, I have known many persons led by Cartesianism to admit of no other God than the immensity of things; while, on the contrary, I never knew one Newtonian, who was not a Theist in the strictest sense. He who, with Descartes, is once persuaded, that it is impossible for the world to be finite; that motion is ever the same; when any one can presume to say, give me motion and matter, and I will make you a world: then such ideas, it must be owned by consequences too just, seem to exclude the

idea of a being alone infinite, alone author of motion, alone author of the organizations of substances.

It may perhaps appear strange to many, that among all the proofs of the existence of a God, the strongest, in Newton's opinion, is that of final causes. The design, or rather the designs, various *ad infinitum*, displayed in the most enormous and most minute parts of the universe, form a demonstration, which, from its being so manifestly sensible, is little regarded by some philosophers; but Newton thought, that these infinite relations, which he, more than any other man, discerned, could only be the work of an artist infinitely wise.

He made little account of the proof drawn from the succession of beings. It is commonly said, that if men, animals, vegetables, and whatever compose this world, were eternal, a series of generations, without cause, must of consequence be admitted. The existence of these beings, it is said, would have no origin; no external can be supposed to rise again from generation to generation, without a beginning; no external, because no one can exist of itself. Thus every thing would be effect, and nothing cause.

This argument appeared to him founded

only on the ambiguity of *generations*, and of beings *formed one by the other*. For atheists, who admit a plenum, answer, that there are, properly speaking, no generations: there are not several substances: the universe is a whole necessarily existing, incessantly displaying itself. It is one and the same Being, whose nature is immutable in its substance, and eternally varied in its modifications. Thus the argument, drawn from the succession of beings, would perhaps prove very little against an atheist, who should deny the plurality of beings. He would have recourse to those antient axioms, that nothing is produced by nothing; that one substance cannot produce another; that every thing is eternal and necessary.

Matter, say the atheists, is necessary, because it exists; motion is necessary, because nothing is at rest; and motion is so necessary, that in nature never any motive forces are lost.

What is to day was yesterday; therefore it was before yesterday; and thus recurring without end. No person will dare to say, that things shall return to nothing; how then dare we to say that they came from nothing?

Dr. Clarke's whole book is not more than sufficient to answer those objections.

In a word, I know not whether there be a metaphysical proof more striking, and which speaks more strongly to man, than the admirable order reigning in the world; and whether there has ever been a finer argument than the following, *The heavens declare the glory of God*. Accordingly you see that Newton, at the end of his *Optics* and *Principia*, uses no other. No reasoning to him appeared more grand and convincing, in favour of a Deity, than that of Plato, who makes one of his interlocutors say; "You think I have an intelligent soul, because you perceive order in my words and actions; surely then, from the order you see in this world, there must be in it a spirit supremely intelligent."

But if the existence of an eternally almighty Being be proved, it is not equally proved, that this Being is infinitely good in the general sense of the word.

This is the grand refuge of the atheist. If I admit a God, says he, this God must be goodness itself. He, who has given me being, should also give me happiness: but I see only disorder and calamity among mankind. The necessity of an eternal matter offends me less than a Creator dealing so harshly with his creatures. My just complaints, my torturing doubts, con-

tinues he, are not to be removed by being told, that a first man, composed of a body and soul, offended his Creator, and that mankind suffers for his offence. For 1st, if our bodies are derived from this first man, our souls are not; and even, if they are, it seems the most horrid injustice, for the punishment to descend from the fathers to the children. 2dly, It seems evident that the Americans, and the people of the old world, the Negroes and the Laplanders, are not all descended from that first man. The interior constitution of the organs of the Negroes is a palpable demonstration of this. No argument therefore can calm the murmurs arising in my heart against the evils that have over-run this globe. Thus I am forced to reject the idea of a supreme Being; of a Creator infinitely good, who has made infinite evils: and had rather admit the necessity of matter, generations, and eternal vicissitudes, than a God, the free author of miserable creatures.

To this atheist it is answered: The words *good*, *comfort*, and *happiness* are equivocal: what is evil with regard to you, is good in the general plan. The idea of an infinite Being, almighty, all-wise, and omnipresent, does not offend your reason. Will you deny a God

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because you have been afflicted with a fever? You say, he owed you happiness: but what reason had you to think so? Why did he owe you this happiness? Was you in any treaty with him? Therefore to be always happy in this life, you need only acknowledge a God. You who cannot pretend to be perfect in any one thing, how can you expect to be perfectly happy? But suppose that in a continual happiness of a hundred years, you may have a fit of head-ach? shall this short interval of pain induce you to deny a Creator? Surely no. If therefore you do not startle at a quarter of an hour's suffering, why at two hours, why at a day? Why should a year of torment prevail on you to reject the belief of a supreme and universal Artisan?

It is proved, that there is, in this world, more good than evil; for, after all, few men are to be found who really wish for death. You then unjustly prefer complaints in the name of mankind, and still more so to deny your sovereign, under pretence that some of his subjects are unhappy.

Men are fond of murmuring; there is a pleasure in complaining, but more in living. We delight in viewing only evil and exaggerating it. Read history: it is replied, what is

it more than a continual series of crimes and misfortunes? Agreed; but histories are only the repositories of great events: tempests only are recorded; calms are overlooked. We do not remember that, for these hundred years, there have been a sedition in Pekin, in Rome, in Venice, in Paris, in London; and that, in general there are in all great cities more quiet than tempestuous years, more harmless and serene days, than days distinguished by great crimes and great misfortunes.

After examining the relations between the springs and organs of an animal, and the designs which display themselves in every part, the manner by which this animal receives life, by which he sustains it, and by which he gives it; you readily acknowledge with admiration the supreme Artist. Will you then change your opinion, because wolves eat the sheep, and spiders catch flies? Do not you, on the contrary, perceive, that these continual generations, ever devoured, and ever reproduced, are a part of the plan of the universe? Wisdom and power, you answer, are perceivable in them; but goodness is still wanting. How! You breed creatures in a menagery, and at a proper season slay them; but must not be censured: while you accuse the master of all

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animals of cruelty, because he has made them to be eaten. In fine, if you may be happy to all eternity, can any pains and afflictions in this fleeting instant, called life, be worth mentioning? And if this eternity be not your portion, make yourself easy with this life which you so highly value.

You cannot think the Creator *good*, because there is some *evil* in the world. But if necessity supplies the place of a supreme Being; will affairs be mended? in the system which admits a God, some difficulties only are to be removed; in all the other systems we must encounter absurdities.

Philosophy indeed plainly shews us, that there is a God; but it cannot teach us what he is, what he is doing, how and wherefore he does it; whether he exists in time, or in space; whether he has commanded once, or whether he is always acting; whether he be in matter, or whether he be not there; etc. To himself only these things are known.

with That of LEIBNITZ.

C H A P. II.

Of SPACE and DURATION, as Properties of God.

Opinion of Leibnitz. Opinion and reasoning of Newton. Infinite matter impossible. Epicurus should have admitted a God, Creator and governor. Properties of pure space and duration.

SPACE and duration are considered by Newton as two beings, whose existence necessary flows from God himself; for the infinite Being is in every place; therefore every place exists: the eternal Being lasts from all eternity, therefore an eternal duration is real.

Newton, in his questions at the end of his Optics, happened to ask, "Do not these phenomena of nature prove, that there is a Being incorporeal, living, intelligent, and omnipresent; who, in infinite space, as in his *sensorium*, sees, discerns, and comprehends every thing in the most intimate, and most perfect manner?"

The celebrated philosopher, Leibnitz, who at first agreed with Newton, in regard to the

reality of pure space and duration, but some time after opposed him in every thing, and placed himself at the head of a different sect in Germany, attacked these expressions of the English philosopher, in a letter, written in 1715, to the late queen of England, consort to George II. That princess, truly worthy of the correspondence of Leibnitz and Newton, set on foot a regular dispute by letters between the two parties; but Newton, being intirely averse to all controversy, and a very great oeconomist of his time, permitted Dr. Clarke, his disciple in philosophy, and at least his equal in metaphysics, to enter the lists for him. The dispute turned upon almost all the metaphysical ideas of Newton, and is perhaps the finest monument of literary contests existing.

Clarke began by justifying the comparison taken from the *sensorium*, used by Newton. He lays it down as a principle, that no being can act, know, or perceive where it is not; now God acting and seeing every where, acts and sees in every point of space, which in this sense alone may be considered as his *sensorium*, from the impossibility of expressing ourselves in any language when we presume to speak of God. Leibnitz affirmed space to be nothing

out the relation we conceive between co-existent beings ; nothing but the order of bodies, their arrangement, their distances, etc. Clarke, after Newton, maintains, that if space be not real, an absurdity will follow. For if God had placed the earth, the sun, and the moon, where the fixed stars are, provided the earth, the moon, and the sun were in the same order with regard to each other as they now are, the consequence would be, that the place then occupied by the earth, the moon, and the sun, would be the same with that they occupy at present ; which is a contradiction in terms.

We are, according to Newton, to think the same of duration as of space ; that it is a reality ; for were duration only an order of succession between creatures, it would follow, that what was doing to-day, and what was done a thousand years ago, would, in reality, be done in the same instant. In fine, space and duration are quantities, therefore something very positive.

It is proper here to take notice of the following argument of the ancients, as it has never been answered. A man at the extremity of the universe holds out his arm : this arm must be in pure space, for it is not in nullibiety ; and if it be answered, that it is still in

matter, the world will then be infinite, and therefore in this sense the world is God.

Pure space then exists; a vacuum exists as well as matter, and exists even necessarily; whereas matter, according to Clarke, exists purely by the free will of the Creator.

But, it will be said, you admit an immense, an infinite space; why not admit the same with regard to matter, as so many ancient philosophers have done? Clarke answers: space exists necessarily, because God exists necessarily. It is immense; it is, like duration, a mode; an infinite property of a being necessarily infinite. Matter is not so; it does not exist necessarily; for was this substance infinite, it would be either an essential property of God, or God himself; but it is neither the one nor the other; therefore it is not, nor can be infinite.

It may be answered to Clarke: matter may necessarily exist, without being on that account infinite; without being God; it exists because it exists: it is eternal because it exists to-day. A philosopher is not to admit what he cannot conceive; nor can you either conceive the creation nor annihilation of matter. It may very well be eternal by its nature; and God may very well, by his nature, have the immense

power of modifying it, though not that of making it from nothing; for to make a being from nothing is a contradiction; but there is no contradiction in believing matter necessary and eternal, and God necessary and eternal. If space exists of necessity, matter also exists of necessity. You ought therefore to admit three beings; space, whose existence would be real, were there neither matter nor God; matter, which, as it could not have been formed from nothing, is necessarily in space; and God, without whom matter could neither be organised nor animated.

These difficulties Newton himself seems to obviate, at the end of his optics. He maintains, that space necessarily flows from the existence of God. God, properly speaking, is neither in space nor place. Thus duration, eternal permanence, follows indispensibly from the existence of God. He is neither in infinite duration, nor in time; but eternally existing; and thus he constitutes eternity and time. In this manner Newton explains himself; but this is not solving the problem. He seems fearful of owing, that God is in space: he was afraid of disputes.

Immense, extended, inseparable space, may be considered in several portions. For instance,

the space occupied by Saturn, is not the space occupied by Jupiter; but these conceivable parts cannot be separated; the one cannot be put in the place of the other, as one body may be put in the place of another. In the same manner, duration, infinite, inseparable, and without parts, may be conceived in several portions; though to conceive one portion of duration put in the place of another would be an utter impossibility. Beings exist in a certain portion of duration, called time, and may exist in any other time; but a part conceived of the duration, any particular time, can only be where it is. The past cannot be the future.

Space and duration then, according to Newton, are two necessary and immutable attributes of the eternal and immense Being. God alone can know all space: God alone can know all duration. Some parts of space, improperly so called, we measure by means of extended bodies which we touch: we measure parts of duration improperly so called, by means of motions perceived by us.

But instead of entering here into a detail of the physical proofs reserved for other chapters, let it suffice to observe, that in whatever concerns space, duration, and the limits of the

world, Newton followed the opinions of Democritus, Epicurus, and a crowd of philosophers, as refined by our celebrated Gassendi. Newton has often declared to some French gentlemen still living, that he esteemed Gassendi as a very sagacious, accurate, and prudent genius; and that he accounted it an honour in being intirely of his opinion, with regard to all the points we have been considering.

C H A P. III.

Of LIBERTY IN GOD, and of the GREAT
PRINCIPLE OF A SUFFICIENT REASON.

*Principles of Leibnitz. Carried perhaps too far.
His reasons very specious. Answer. New
instances against the principles of indiscern-
ables.*

NEWTON hath affirmed, that God, both infinitely free, and infinitely powerful, has created many things, without any other reason for their existence, than his mere will. For instance, that the planets should revolve from west to east, rather than otherwise; that there is such a number of animals, stars, worlds, rather, than any other; that the finite universe occupies such or such a point of space, etc. The sole reason of which is the will of the supreme Being.

The famous Leibnitz embraced the contrary, and grounded his opinion on an antient axiom used by Archimedes; *Nothing is done without a cause, or a sufficient reason*; and God has in all things done the best; because

if he had not done it as the best, there would have been no reason for doing it. But, say the Newtonians, there is no *better* in indifferent things. There are no indifferent things, answer the Leibnitians. Your idea leads to an absolute fatality, said Clarke: you make God a Being acting from necessity, and consequently a Being purely passive; which is no longer God. Your God, replied Leibnitz, is a capricious artist, determining without sufficient reason. The will of God is reason, returned the Englishman. Leibnitz insisted on his point, and pushed it very forcibly in this manner.

No two bodies in nature are known to be entirely alike; nor is it possible they should: for were they perfectly similar, it would shew in God, who is almighty and all-productive, a want of foecundity and power. Secondly, there would be no reason why the one should occupy this place rather than the other.

The Newtonians answered: First, it is false, that a similarity in several beings would argue sterility in the power of the Creator; for if the elements of things must be absolutely similar to produce similar effects; if, for instance, the elements of rays, eternally red with light, must be the same to form these red rays; if the e-

lements of matter must be the same to form matter; this perfect resemblance, this identity, is so far from being derogatory to the dignity of God, that it appears one of the finest evidences of his power and wisdom.

Might I presume to add any thing here to the arguments of a Clarke and a Newton, and might I take the liberty of disputing against a Leibnitz, I would say, that it is only a Being infinitely powerful that can make things perfectly alike. Whatever attention and labour may be employed by man in such works, he will never attain it, because his sight will never be sufficiently delicate to discern the inequalities in the two bodies. To make all the parts of one body similar to those of another, infinite minuteness must be seen: this therefore can only be performed by an infinite Being.

Secondly, the Newtonians may also say, we fight Leibnitz with his own weapons. If the elements of things be all different; if the original parts of a red ray be not entirely alike; there is then no sufficient reason why different parts always produce the same effect.

Thirdly, it may further be said by the Newtonians; if one ask a sufficient reason why the atom A, is in one place, and the atom B, exactly similar, is in another, the reason lies in the

motion which impels them; and if we ask the reason of this motion, you must either say, that this motion is necessary, or own that God began it. In fine, if it should be asked, why God began it, what other sufficient reason can be given? than that God must have ordered this motion, to perform the works projected by his wisdom? But why this motion rather to the right than to the left, rather westward than eastward? Must we not then recur to the will of the Creator? But is there a liberty of indifference? This we shall leave to the examination of every reflecting reader; and he will long examine, before he will be able to form a decision.

C H A P. IV.

OF LIBERTY IN MAN.

Excellent piece against liberty ; so well written that Dr. Clarke made use of indecent language in his answer. Liberty of indifference. Liberty of spontaneity. Privation of Liberty very common. Strong objections against Liberty.

ACCORDING to Newton and Clarke, the infinite free Being has communicated to man, his creature, a limited portion of that liberty ; and by liberty here is not understood, the simple power of applying our thoughts to such or such an object, and of beginning the motion ; not only the faculty of willing is meant, but that of willing in the most free and efficacious manner ; and even of willing without any other reason than the will itself. There is not a man on the earth, who does not believe that he sometimes feels himself possessed of this liberty. Many philosophers, however, think the contrary : and that all the liberty we en-

joy is, that of wearing sometimes freely the fetters of fatality.

Among all the philosophers who have written boldly against liberty, he who has indisputably performed the task with most method, strength and clearness, is Collins, an English gentleman, author of a discourse on free-thinking, and several other works, equally bold and philosophical.

Clarke, who was entirely of Newton's opinion, with regard to liberty, and who also maintained its right, both as a divine of a singular sect, and as a philosopher, answered Collins warmly, and mixed so much acrimony with his arguments, as gave occasion to think, that he felt at least his adversary's whole strength. He charged him with confounding all ideas; because Collins called man a necessary agent; Clarke says, if this be true, man is no longer an agent. But who does not see, that this is true chicanery? Whatever produces necessary effects, Collins calls a necessary agent. Is it of any consequence whether he be called agent or patient? The point is to know whether he be necessarily determined.

If only one single case can be found, where man is really free with a liberty of indifference, that alone seems sufficient to decide the quest-

ion. Now what case shall we find more proper, than that where our liberty is put to trial? For instance, it is proposed to me to turn to the right or the left, or to do some other action, to which neither pleasure attracts, nor disgust diverts. I then chuse, and do not follow the dictates of my understanding, which represents to me the best; for in this case there is neither better nor worse. How do I act? I exercise a right which God has given me of willing and acting in certain cases, without any other reason than my own will. I enjoy a right and power to begin the motion, and begin it in which side I please. If, in this case, my will alone directs me, why should any other cause be sought than my own will? It seems probable, therefore, that in indifferent things, we have the liberty of indifference. For who can say, that God has, or has not been able to confer on us this gift? And if he is able, and we feel this power in ourselves, how can it be affirmed, that we do not enjoy it?

This liberty of indifference is, however, treated as a chimera; it is said, that to determine without a reason, belongs only to madmen: but it should be remembered, that madmen are distempered persons, without any liberty.

They are necessarily determined by the disorder of their organs. They are not their own masters, they chuse nothing. He is free, who determines for himself. Now why shall we not, in things indifferent, determine ourselves merely by our own will?

We enjoy, in all other cases, the liberty called spontaneity; that is, our will is determined by motives when there are any; and these motives are always the last result of the understanding or instinct. Thus, when my understanding represents to itself, that it is better for me to obey than break the law, I conform to the law with a spontaneous liberty. I perform voluntarily what the last *dictamen* of my understanding leads me to perform. This species of liberty is never better perceived, than when our will opposes our desires. I have a violent passion for something, but my understanding tells me, I must resist this passion; it represents to me a greater good in victory, than in a compliance with my appetite. This last motive preponderates, and I oppose my desires by my will. This command of my reason I necessarily and willingly obey; I do not what I desire, but what I will; and, in this case, I am free, and enjoy all the liber-

ty of which such a circumstance can make me susceptible.

In fine, I am free in no respect, when my passion is too strong, and my understanding too weak, or when my organs are disordered ; and this is unfortunately very often the case of men : so that the spontaneous liberty is to the soul, what health is to the body ; some enjoy it entirely and constantly ; many are often deprived of it, and others are sick during their whole life : all the other faculties of man are subject to the same variation. Sight, hearing, taste, strength, cogitation, are sometimes stronger and sometimes weaker ; our liberty, like every thing else, is limited, variable, in a word, very trifling ; because man is himself inconsiderable.

The difficulty of reconciling the liberty of human actions with God's eternal prescience, was no obstacle to Newton ; he avoided that labyrinth : liberty being once proved, it is not for us to determine how God foresees what we shall freely do. We know not how God sees what passes at present. We have no idea of his mode of seeing ; why then should we have any of his mode of foreseeing ? We should consider all his attributes as equally incomprehensible.

It must be owned, that against this idea of liberty, there are objections which startle. It is immediately seen that this liberty of indifference would be but a very trivial present, if it extended no farther than spitting to the right or left, or chusing either odd or even. The business is whether Cartouche and Shah Nadir have a liberty of not shedding human blood. Of what consequence is the liberty of putting the left or right foot forward? This liberty of indifference is then found to be impossible; for how can we be said to determine without reason? You will; but why will you? You are asked even or odd; you chose even, without being aware of the motive, which is, that even presents itself to your mind at the instant you make the choice.

Every thing has its cause: consequently your will is not excepted. There is then no willing, but in consequence of the last idea received. No person can know what idea he will have the next moment; therefore, no person is master of his own ideas; therefore, no person is master of willing or not willing. Were he master of these, he might perform the contrary of what God has disposed in the concatenation of the things of this world. Thus

every person might, and actually would, change the eternal order.

It was on this account that the wise Locke never mentioned the name of liberty; free-will seemed to him only a chimera. All the liberty he knew was, the power of doing what one wills. A patient during the paroxysm of the gout has not the liberty of walking; nor the prisoner that of going abroad; the one becomes free when cured: the other on opening to him the gate.

To place these alarming difficulties in a stronger light, I will suppose that Cicero is attempting to prove to Cataline that he ought not to conspire against his country. Cataline tells him it is out of his power; that his conferences with Cethegus have imprinted in his mind the idea of the conspiracy; that this idea pleases him beyond any other; and that we only will in consequence of our last decision. But you might, answers Cicero, adopt other ideas as well as I, by listening attentively to me, and reflecting on the duty of consulting the good of your country. It is of no consequence, returns Cataline; your idea offends me; and the desire of assassinating you prevails. I am sorry for your madness, says Cicero, endeavour to take some of my medicines. If I

am mad, replies Cataline, I cannot command my endeavours to be cured. But, urges the consul, men are indued with reason, which they may consult, and may cure the disorder of the organs, which renders you thus reverse, thus hardened in so horrid a crime; especially if this disorder be not too strong. Shew me, replies Cataline, the point where this disorder is curable. For my part, I own, that from the first moment I began the conspiracy, all my reflections have tended to make me persevere in the undertaking. When did you first take this fatal resolution? asks the consul. When I had lost my money at play. And could not you have abstained from play? No, for the idea of play predominated at that time in my mind above all other ideas: and had I not played, I should have discomposed the order of the universe, by which Quartilla was to win four hundred thousand sesterces of me; with this money she was to purchase a house and a gallant; by this gallant she was to have a son; Cethegus and Lentilus were to come to my house, and we were to conspire against the republic. Destiny has made me a wolf, and you a shepherd's dog: Destiny will decide which is to cut the throat of the other. To this Cicero could have answered only by an

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oration. It must, indeed, be allowed, that the objections against liberty can hardly be answered, but by a vague eloquence: a melancholy subject, on which the wiser a person is, the more he fears, even to consider it.

There is, however, one comfortable reflection, namely, that which ever system we embrace, by whatever fatality we suppose all our actions are governed, we shall always act as if we were free.

C H A P. V.

DOUBTS WITH REGARD TO THAT LIBERTY,
CALLED, THE LIBERTY OF INDIFFERENCE.

1. **P**LANTS are organised beings, in which every thing is done necessarily. Some plants belong to the animal kingdom, and are in effect animals attached to the earth.

2. Can these animal plants, with roots, leaves, and sensation, be supposed to have liberty? No surely.

3. Have not animals a perception, an instinct, a reason begun, a measure of ideas and of memory? What, in reality, is instinct? is it not one of those secret springs we can never know? Nothing can be known but by analysis, or a consequence of what are called the first principles. Now what analysis, or what synthesis can explain the nature of instinct? We only perceive that this instinct is always necessarily accompanied with ideas. A silk worm has a perception of the leaf which nourishes it; the partridge, of the worm which it seeks and swallows; the fox, of the partridge

which it eats; the wolf of the fox, which it devours. Now it is not very likely that these beings possess what we call liberty: may we not, therefore, have ideas without being free?

4. Men receive and combine ideas in their sleep; but they cannot be said to be then free. Is not this a fresh proof, that we may have ideas without being free?

5. Man has, above other animals, the gift of a more comprehensive memory: this memory is the sole source of all his thoughts. Can this source, common to animals and men, produce liberty? The ideas of reflections in one brain, can they be any other than ideas of reflection in another?

6. Are not all men determined by their instinct? And is not this the reason why they never change their character? Is not this instinct what we call the disposition?

7. Were we free, where is the man that would not change his disposition? But was ever a man seen on earth, who gave himself one single propensity? Was there ever a man born with an aversion to dancing, that gave himself a taste for dancing? a sluggish and sedentary man to seek motion? Do not age and a regimen diminish the passions which reason fancies it has subdued?

8. Is not the will the last consequence of the last ideas received? If these ideas are necessary, is not the will also necessary?

9. Is liberty any thing more than the power of acting or not acting? and was not Locke in the right to call liberty, power?

10. A wolf has the perception of sheep feeding in a meadow; his instinct prompts him to devour them; but is prevented by the dogs. A conqueror has the perception of a province, which his instinct leads him to invade; he finds fortresses and armies to obstruct his passage. Where is the great difference between the wolf and the conqueror?

11. Does not this universe appear in all its parts subjected to immutable laws? If a man might, at his pleasure, direct his will, is it not plain, that he might discompose these immutable laws?

12. By what privilege should man be exempted from the same necessity, to which the stars, animals, plants, and every thing else in nature are subjected?

13. It is justly said, that in the system of this universal fatality, punishments and rewards would be useless and absurd? Is it not rather evident that the inutility and absurdity of pu-

nishments and rewards appears in the system of liberty? In short, if a highwayman is possessed of a free will, determining itself solely by itself, the fear of punishment may very well fail of determining him to renounce robbery: but if the physical causes act alone; if the sight of the gibbet and wheel make a necessary and violent impression; they then necessarily correct the villain, while he is gazing at the execution of another.

14. To know whether the soul be free, should not we first know what this soul is? Can any one boast that his reason alone demonstrates to him the spiritual nature, the immortality of the soul? It is the general opinion of physicians, that the principle of sensation resides in the place where the nerves unite in the brain. But this place is not a mathematical point. The origin of every nerve is extended. There is in that place a bell, on which the fine organs of our senses strike; but who can conceive that this bell occupies no point of place? are we not automata; born to will always, to do sometimes what we will, and sometimes the contrary? Stars at the center of the earth, without us, and within us, every essence, every substance is to us unknown.

We see only appearances. We are in a dream.

15. Whether in this dream we believe the will free or subject; the organised earth of which we are formed, endued with an immortal or perishable faculty; whether we think like Epicurus, or like Socrates, the wheels that move the machine of the universe, will be always the same.

C H A P. VI.

OF NATURAL RELIGION.

Leibnitz's reproach of Newton, without foundation. Refutation of an opinion of Locke. The good of society, natural religion, humanity.

LEIBNITZ in his dispute with Newton, reproaches him with giving very mean ideas of God, and of subverting natural religion. He pretends that Newton made God corporeal; and this imputation, as we have already seen was founded on the word *sensorium*, or organ. He added, that Newton's God in making this world had made a very awkward machine, which stood in great need of its being cleaned from its filth. Newton had said, *manum emendatricem desideraret*. This reproach is founded on Newton's having said, that in length of time the motions will diminish, the irregularities of the planets increase, and the system either perish, or be again put in order by its author. It is evident from experience that God has made machines to be de-

stroyed. We are the work of his wisdom, and we perish. Why then, should it be otherwise with the world? Leibnitz will not have this world to perish. But if God has formed it only to last for a certain time, its perfection then consists in its lasting only till the instant fixed for its desolation.

As for natural religion, never was man more zealous for it than Newton, unless we except Leibnitz himself, his rival in science and virtue. By natural religion I mean, the principles of morality, common to mankind. Newton indeed admitted no innate ideas, no sentiments, no principles. He was, with Locke, persuaded, that all our ideas proceed from the senses, as they disclose themselves. But he believed, that God having given the same senses to all men, the same wants, the same sentiments; consequently the same rude notions, every where the foundation of society, prevail among all mankind. It is certain that God has given to bees and ants, something to induce them to live in common, which he has not given to wolves nor falcons. It is certain, from all mens living in society, there is, in their essence, a secret tie by which God intended to connect them together. Now if at a certain age the ideas, flowing from the senses

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to men all organized in the same manner, did not gradually give them the same principles necessary to society, it is certain that such society could not subsist. This is the reason why truth, gratitude, friendship, *etc.* are esteemed from Siam to Mexico.

It has always seemed strange to me, that so wise a man as Locke, in the beginning of his essay on human understanding, where he so effectually refutes innate ideas, should have advanced, that there is no notion of good and evil common to all men. I believe this to be a mistake. It is founded on the narratives of travellers, who say, that in some countries it is customary for parents to eat their children, and to eat women also when past child-bearing; that in others, certain enthusiasts, who make use of she-asses instead of women, are honoured with the name of saints. But should not such a man as Locke have suspected these travellers? There is nothing more common than for them to see through a false medium, give a false account of what they have seen, to mistake the intention, especially in a nation to whose language they are strangers, and, in fine, to judge of the manners of a whole people by a particular fact, whose circumstances are to them unknown.

Were a Persian at Lisbon, at Madrid, or at Goa, on the day of an auto-de-fe, he would think, and not without an appearance of reason, that the Christians sacrificed men to God. Let him look into the almanacks, sold all over Europe among the lower class, and he will conclude, that we all believe in the effects of the moon ; though this is so far from being true, that we laugh at them. Thus should a traveller tell me, for instance, that the savages eat their father or mother from filial affection, he will give me leave to answer him, that, first, the fact is very dubious. Secondly, if it be true, it will be so far from destroying the idea of respect due to parents, that it is, probably, a barbarous manner of shewing tenderness ; a horrible mistake of the law of nature. For possibly they kill their parents from mere duty, to free them from the troubles of old age, or the fury of an enemy : and if they thus give their parents a tomb within their own bodies, instead of being devoured by savage conquerors, this custom, however shocking it may appear to human nature, necessarily flows from a goodness of heart. Natural religion is nothing more than this law known through the world, *do as you would be done by*. Now the savage, who kills his father to save him from

the enemy, and who buries him in his breast, that he may not find a grave in the bowels of his enemy, wishes that his son may treat him in the same manner, if reduced to the same exigency. This law of treating our neighbour as ourselves, flows naturally from the rudest notions, and sooner or later is heard in the heart of all men; for having all the same reason, the fruits of that tree must have a resemblance; and they do, in reality, resemble each other; for in every society the name of virtue is given to whatever is thought useful to the society.

Name me a country upon earth, or a company of ten persons, where what tends to promote the common good is not esteemed; and when you have done this, I will allow, there is no natural law. This law is, doubtless, infinitely varied; but can we infer from thence any thing more than that it exists? Matter every where receives different forms, yet every where retains its nature. It is in vain to say, that theft was enjoined at Lacedemon? but in a city where every thing was common, a permission to take dexterously what private persons appropriated to themselves contrary to law, was a method of punishing the spirit of appropriation prohibited among that people.

Meum and *Tuum* was a crime, for which what we call theft was the punishment; and among them, as among us, there was some order, made by God for us, as he has made the ants to live in society.

Thus Newton was persuaded, that this disposition, which we all have for living in society, is the foundation of the law of nature.

There is in man a disposition to compassion equally general with our other instincts. Newton had cultivated this sentiment of humanity, and even extended it to animals. He was, like Locke, firmly persuaded, that God had given to animals (however they might seem to be only matter) a measure of ideas, and the same sensations with ourselves. He could not think that God, who does nothing in vain, could have given to beasts organs of sensation, that they might have no sensation.

To believe that beasts feel, and to make them suffer, appeared to him a horrid contradiction; and his morality in this respect was conformable to his philosophy. It was even with regret that he complied with the barbarous custom of feeding on the blood and flesh of beings like ourselves, whom we daily carressed; and in his house he never allowed them to be put to a lingering or uncommon

death, to render their flesh more delicious.

This compassion for animals was improved towards mankind into the noblest benevolence. Indeed without humanity, a virtue which includes all virtues, we shall very ill deserve the name of philosophers.

C H A P. VII.

OF THE SOUL, AND ITS MANNER OF UNION
WITH THE BODY, AND HOW IT RECEIVES
ITS IDEAS.

*Four opinions on the formation of ideas. Those
of the antient materialists. That of Mal-
branche. That of Leibnitz. Confutation
of the opinion of Leibnitz.*

NEWTON, like almost all true phi-
losophers, was persuaded, that the
soul is an incomprehensible substance; and se-
veral persons, who have conversed with Locke,
have assured me that Newton owned to Locke,
“ that we have not a sufficient knowlege of
“ nature, for us to dare to affirm, that it is
“ impossible to God to add the gift of thought
“ to any extended substance whatsoever.” But
the great difficulty is rather to know how any
thing whatever can think, than to know how
matter can become cogitative. Thought, in-
deed, seems to have nothing in common with
the known attributes in that extended being
which we call body. But are we acquainted

with all the properties of bodies? Does it not seem very bold to say to God, you have been able to give a being motion, gravitation, vegetation, and life; but cannot give it thought?

They who say, that if matter could receive the gift of cogitation, the soul would not be immortal, seem to have drawn an unfair consequence. Is it more difficult for God to preserve than to make? Besides, if an inseparable atom be eternal, why shall not the faculty of cogitation it enjoys last as long? If I am not mistaken, they who deny God to have the power of annexing ideas to matter, are forced to say, that what we call spirit is a being whose essence is to think, exclusive of any extended being whatever. Now if it be the nature of spirit to think essentially, then it thinks necessarily and thinks incessantly, as every triangle has necessarily and always three angles, independently of God. How! on God's creating something, which is not matter, must that something absolutely think? Weak and bold as we are, do we know whether God has not formed millions of beings, which have neither the properties of spirits nor matter as known to us? We are like a herdsman, who having seen no other beasts than oxen, should say, *if God pleases to make other beasts, they must*

have horns and chew the cud. Which will be thought more reverential to the deity to affirm, that there are beings without the divine attribute of cogitation abstractedly from him, or to apprehend that God can grant that attribute to any being he shall please to chuse? This alone shews the injustice of those who have charged that opinion on Locke as a crime, and, with a cruel malignity, employed the weapons of religion against an idea merely philosophical.

It must be observed, that Newton was very far from venturing to define the soul, as so many others have presumed to do. He thought it was possible there might be millions of other thinking beings, whose nature might be entirely different from that of our soul; so that the division of all nature into matter and spirits, seems the definition of a deaf and blind man defining the senses, without any idea or conception of sight or hearing. How, indeed, can any one say, that God has not filled the immense space with an infinity of substances, having nothing in common with mankind?

Newton had not formed to himself any system on the manner in which the soul is united to the body, and the formation of ideas. An enemy to systems, he judged only from a

nalysis; and when that light was wanting he proceeded no farther.

Hitherto four opinions have prevailed concerning the formation of ideas; the first is that of almost all the ancient nations, who, conceiving nothing beyond matter, looked on ideas in our understanding as the impresson of the seal on wax. This perplexed opinion was rather a rude instinct than ratiocination. Succeeding philosophers, who were for proving that matter thinks of itself, have erred still more: the vulgar were mistaken without any previous reasoning; these erred from principles; not one of them being ever able to discover any thing in matter, that tended to prove it was intelligent. Locke alone appears to have removed the contradiction between matter and thought, recurring at once to the Creator of all thought and of all matter, and modestly saying, "Cannot he, who can do every thing, give cogitation to a material being, to an atom, to an element of matter?" He stopped at this possibility as became a man of his wisdom. To affirm that matter does actually think, because God could impart such a faculty to it, would be the highest presumption; but is it less to assert the contrary?

The second, and most generally received

opinion, is, that which considers the soul and body as two distinct and quite different beings, created by God to act on each other. The only proof of this reciprocal action is experience, which every one believes to have of it; we feel our bodies sometimes obeying our will, and sometimes tyrannizing over it: we conceive that they in reality act on each other, because we feel it, and we cannot carry our investigations farther. An objection, however, lies against this system, not easily removed; an external object, for instance, communicates a vibration to the nerves, which motion either extends to the soul or not; if it reaches the soul, it imparts motion to it, which would suppose the soul to be corporeal; if it does not, there is no longer any action. All the answer that can be given is; this action is one of those things, the mechanism of which will for ever remain unknown: a sad conclusion; but almost the only one becoming man in more than in one point of metaphysics.

The third system is the occasional causes of Descartes, carried still farther by Malebranche. He begins with supposing that the soul can have no influence on the body, and in this goes immediately too far; for though the influence of the soul on the body be inconceiv-

able, it does not therefore follow, that it is impossible: he then supposes that matter, as an occasional cause, makes an impression on our body; and in consequence of that impression, God produces an idea in our soul; and reciprocally, man produces an act of volition, and God acts immediately on the body, in consequence of that volition. Thus man acts and thinks only in God; which, I think, admits of no other explanation, than that God alone acts and thinks for us. This hypothesis abounds with such difficulties, that the reflective mind labours in vain for a solution; for how, according to this system, can a man will of himself, without having the power to think of himself? If God has not given us the faculty of producing motion and ideas, if it is he alone who acts and thinks, it is he alone who wills. In this case we are not only without liberty, but we are nothing, or we are modifications of God himself. In this case there is no longer a soul, an intelligence in man; the union of the soul and body need not be any longer considered; there is no such thing, and God alone exists.

The fourth sentiment is the pre-established harmony of Leibnitz. According to this hypothesis, the soul has no intercourse with its

body ; they are two clocks made by God, each has its spring, and goes for a certain time in perfect agreement ; one points the hours, the other strikes. The clock which shews the hour does not shew it, because the other strikes ; but God has so determined their motions, that the hand or index, and the chimes, may always agree. Thus the soul of Virgil produced the Eneid, and his hand wrote the Eneid, without this hand in the least obeying the intention of the author ; but God had, from everlasting, ordained that the soul of Virgil should make verses, while a hand annexed to Virgil's body should reduce them into writing. Not to mention the extreme difficulty which here also occurs in reconciling liberty with this pre-established harmony, a very strong objection is, that if, according to Leibnitz, nothing is done without a sufficient reason taken from the foundation of things, what reason had God to unite two incommensurables, two beings so heterogeneous, so infinitely different as the soul and body, and the one having no manner of influence on the other ? My soul might as well have been placed in Saturn as in my body ; the union of the soul and body becomes utterly needless and superfluous ; but the rest of Leibnitz's system is still more extraordinary ;

the fundamental principles of it may be seen in the supplement to the Leipzig Acts, vol. VII. and the ample comments on them by several Germans, in a method entirely geometrical, may be consulted.

According to Leibnitz there are four sorts of simple beings, which he termed *monades*, as will be seen in chap. IX. We shall here speak only of that kind of *monade*, called our soul. The soul, says he, is a concentration, a *living mirrour of the whole universe*, having confused ideas of all the modifications of this world, past, present, and to come. Newton, Locke, and Clarke, on hearing such an opinion, expressed the greatest contempt of it, as if Leibnitz was not the author : but very great philosophers among the Germans having thought it worth their while to explain what no Englishman ever thought worth considering, I cannot avoid exhibiting this hypothesis of the celebrated Leibnitz, which is the more respectable to me, since it has become an object of your inquiries. Every simple created being, says he, is subject to change, otherwise it would be God. The soul is a simple created thing, consequently cannot remain in the same state ; but bodies being compounded, can make no alteration in a simple being ; the source then

of its variations must be placed in its own nature. Its changes then are successive ideas of the things of this universe; some are clear; but all the things of this universe, says Leibnitz, have such a mutual dependance, are so eternally connected together, that if the soul has a clear idea of one of those things, its ideas of all the other are necessarily obscure and confused. This opinion may be illustrated by the example of a man, who has a clear idea of a game, at the same time he has many confused ideas of several combinations of this game. A man, who has, at present, a clear idea of a triangle, has an idea of several properties of the triangle, which may afterwards present themselves successively to his mind more clearly. In this sense it is, "*that the monade of man is a living mirror of this universe.*"

It is easy to answer, that if God has made a looking-glass of the soul, he has made a very dull one; and if there be no other reason for advancing such strange suppositions, than this pretended indispensable connection between all the things of the present world, this bold structure is erected on secret foundations; for when we have a clear idea of a triangle, it is because we have a sufficient knowledge of the essential properties of a triangle; and if

the ideas of all these properties do not suddenly offer themselves clearly to our mind, they are included in that clear idea, there being a necessary relation or conformity between the one and the other. But is this the case with regard to the whole assemblage of the universe?—Take away one property from the triangle, and you take away all: but does the taking away a grain of sand from the universe, occasion an intire change in the remainder? If among a hundred millions of beings following by pairs, the two first change places, do the others also necessarily change? Does not the same relation still subsist between them? Besides, can the ideas of a man be said to have the same concatenation, as is supposed to subsist between the things of this world? What connection, what necessary medium is there between the idea of night, and the unknown objects I behold on my waking? What connection is there between the transitory death of the soul in a profound sleep, or a swoon, and the ideas received on our waking or recovery?

Every being in this universe is undoubtedly related to the universe; but it is not every action of every being, that is the cause of e-

vents in the world. The mother of Brutus, in bringing him into the world, was one of the causes of Caesar's death ; but her spitting to the right or left, was of no consequence to Rome. There are events which are at once both effect and cause. There are a thousand actions which are only consequential effects. The vanes of a windmill turn round, and by their motion cause the grain, by which man is nourished, to be ground : this is both an effect and cause. A few particles of dust fly from it ; this is an inconsequential effect. A stone thrown into the Baltic sea, produces no effect in the Indian ocean ; a thousand effects produce nothing, like the motion in fluids.

Were it even possible that God should have made all that Leibnitz imagines ; must we believe it on a bare possibility ? What has he proved by all these fresh efforts ? Nothing more than that he had a very great genius. But has he given either himself or others any light ? Strange ! we know not how the earth produces a blade of grass ; how a woman conceives a child ; and yet we pretend to know how ideas are produced !

If it be asked, what thoughts Newton entertained with regard to the soul, the manner

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of its operations, and which of all these sentiments he embraced? I answer, he espoused none. What then did he, who had subjected infinity to calculation, and discovered the laws of gravity, know on this subject? He knew where to doubt,

C H A P. VIII.

OF THE FIRST PRINCIPLES OF MATTER.

Examination of the first Matter. Newton mistaken. No real Transmutations. Newton admits of Atoms.

IT is our business to examine which system was most ridiculous; that which considered water as the principle of all things, that which attributed every thing to fire, or that which supposes cubes placed in contact with each other, without any interstices, and turning I know not how on themselves.

The most plausible system has ever been, that there is a first matter absolutely indifferent, uniform, and capable of all shapes, and being differently combined, constitutes this universe. The elements of this matter are the same, acquiring its modifications from the moulds through which it passes; as a metal in fusion becomes sometimes an urn, sometimes a statue. This was Descartes's opinion, and perfectly agrees with the chimera of his three elements. Newton, in this respect, follow-

ed Descartes; but he arrived at this conclusion another way. As he very seldom formed a judgement that was not grounded either on mathematical or experimental proof; so, in this enquiry he thought himself supported by experience. The celebrated Mr. Boyle, the founder of experimental philosophy in England, had kept water a long time in a retort, exposed to an equal degree of heat; and the chemist, who performed his experiments, imagined that the water was at length changed into earth. But the fact was otherwise, as has since been proved by Boerhaave, who was at once an accurate naturalist and skilful physician. The water had evaporated, and the earth, found in the vessel, came from elsewhere.

How are experiments to be mistrusted, after imposing on Boyle and Newton! Those great philosophers were persuaded that the primitive particles of water change into particles of earth; the elements of things are only the same matter differently arranged. Had not a false experiment misled Newton to this conclusion, he would, perhaps, have reasoned quite otherwise. I would beg the reader's attention to what follows.

The only method of reasoning on objects, suitable to man, is analysis. To begin with

the first principles, belongs only to God. And if we may, without blasphemy, compare the divine Being to an architect, and the universe to an edifice; where is the traveller who had seen only part of the outside of the building, would immediately imagine he was able to display all the art and contrivance within? Yet have not almost all philosophers, with a thousand times greater temerity, dared to do even more than this? Let us then examine this edifice as far as we are able. What do we meet with around us? Animals, vegetables, minerals (including under the latter all salts, sulphurs, *etc.*) earth, sand, water, fire, air, and nothing else, at least hitherto known.

Before I proceed to examine whether those bodies are mixed or not, I ask myself, whether it be possible, that a matter, supposed uniform, which in itself is nothing that exists, can be productive of every thing that does exist?

I. What is a first matter, which is different from all the things in this world, and yet produces them all? It is something of which I can have no idea, and, therefore, am not to admit. I cannot, indeed, form to myself the general idea of an extended, impenetrable, ductile substance, without thinking of sand,

earth, gold, *etc.* Yet either this matter is really one of those things, or it is nothing at all. In like manner I can think on a triangle in general, without fixing on the equilateral, the scalenous, the isosceles, *etc.* but a triangle existing must be one of these. This reflection alone, thoroughly weighed, is perhaps sufficient to exclude the opinion of a first matter.

II. Were any matter whatever put into motion, sufficient to produce all the objects we behold on the earth ; I see no reason why dust, well shaken in a cask, might not produce men and trees ; nor why a field, sown with grain, might not produce whales and crabs as well as wheat. It is of no consequence to say, that the moulds and strainers of the seed prevent it : for we must always return to this question, where are these moulds, these strainers, so invariably determined ? Now, if no motion, no art, can produce fishes in a field instead of corn ; medlars instead of a lamb in the belly of an ewe ; roses on the top of an oak ; nor soles in a bee-hive, *etc.* If all the species be invariably the same, have not I some reason to conclude, that all the species have been determined by the Sovereign of the world ; that there are as many different designs as there are different species ; and that matter and motion,

without these designs, would produce only an eternal chaos?

I am confirmed in this sentiment by universal experience. If I examine on one hand a man and a silk-worm, and, on the other a bird and a fish; I see they were all formed at the very beginning of things: an unfolding is all that I perceive in them. The unfolding of man, and the unfolding of the insect, agree in some particulars, and differ in others. It is the same with regard to that of the fish and the bird. Man, before he is received into the matrix of his mother, is a worm. He becomes a chrysalis, a nymphe in the uterus, while in-folded in that wrapper called the omentum. He comes out of it with legs and arms, as the worm, when grown to a fly, quits its sepulchre with wings and feet; like the insect he lives some days, and then both bodies dissolve. Among the reptiles, some are oviparous and others viviparous. The female of fishes is prolific, without the approaches of the male, who only passes over the eggs that have been deposited, to hatch them. Vinefretters, oysters, *etc.* propagate their species without the mixture of the two sexes. Polypusses have the power of replacing their heads when cut off. The claws of lobsters are known to be

reproduced. But the formation of vegetables and minerals is entirely different. Every species of being is a distinct world; and so far is blind matter from producing every thing by meer motion, that in all appearance, God has formed an infinity of beings, with infinite means, he being infinite himself.

These are my first conjectures on taking a view of nature. But when I enter into a detail, when I proceed to examine every thing by experiment, the result is this: I see mixed bodies, such as vegetables and animals, which I analyze, and draw from them some gross elements, as spirit, phlegm, sulphur, caput mortuum. Other bodies there are, such as metals and minerals, whence nothing can be drawn, except their own parts more attenuated. From pure gold I have never been able to draw any thing but gold; it is the same with mercury. None have been able to change sand, mud, pure water, into any other species of beings. What therefore can I hence infer, but that vegetables and animals are composed of those other primitive beings which can never be analyzed. These primitive unalterable beings are the elements of bodies; the man and the fly are then a compound of mineral particles of sand, of mud, fire, air, water, sulphur, salt; and

all those primitive parts which can never be compounded, are elements, each having its peculiar and invariable nature.

He, who affirms the contrary, should have seen transmutations. But who, with all the helps of chemistry, has ever discovered any? Is not the philosopher's stone considered by all wise men as an impossibility? Is it more possible in the present state of this world, that salt be changed into sulphur, water into air, air into fire, than to make gold by the help of the powder of projection?

Have not men who believe transmutations, properly so called, been deceived by appearances, like those who thought the sun moved? For on seeing corn and water converted in human bodies to blood and flesh, who would not have believed transmutation? Yet what is all this but salts, sulphurs, phlegm, *etc.* differently arranged in the corn and in the human body? The more I reflect on this, the more a metamorphosis, taken in the strictest sense, appears to me a contradiction in terms. I believe two things are requisite to change the primitive parts of salt into the primitive parts of gold, to annihilate the elements of salt, and create the elements of gold. Such is the reality of those pretended metamorphoses of a ho-

mogeneous and uniform matter, though hitherto admitted by so many philosophers. My proof is this.

It is impossible to conceive the immutability of species, unless composed of unalterable principles. For if these principles, these original constituent parts, can never change, they must be perfectly solid, and consequently always of the same figure. If they are such, they cannot be composed of other elements; for they must then receive other figures; therefore in the present constitution of things, it is impossible that the element of salt should be changed into the element of mercury.

It is something strange, that Newton, who admitted of atoms, should have overlooked so natural an induction. He, like Gassendi, admitted of real atoms in divisible bodies; but he arrived at this assertion by the mathematics; at the same time, he thought these atoms, these indivisible elements, were continually changing one into the other. Newton was a man; and therefore, like us, subject to error.

It will, doubtless, be asked how the germes of things, being hard and indivisible, grow and extend themselves? Probably, it is performed only by assemblage, by contiguity; several a-

toms of water form a drop, and the like may be said of the rest.

It still remains to know how this contiguity is performed; how the parts of bodies become mutually connected together. This, perhaps, is one of the secrets of the Creator, which will ever remain unknown to men. How the constituent particles of gold form a lump of that metal, cannot, I think, be known, without seeing those particles.

If I say that attraction is probably the cause of this adhesion and continuity of matter, it is only because nothing more plausible can be advanced; for as it can be demonstrated that all the parts of matter gravitate on each other, whatever the cause be, can any thing more natural be imagined, than that bodies, touching each other in most points, are, by the force of such gravitation, closely connected?

But this is not the place for enlarging on this physical article.

C H A P. IX.

OF THE MONADES, OR THE NATURE OF THE
ELEMENTS OF MATTER.*Opinion of Newton. Opinion of Leibnitz.*

IF ever *audax Japeti genus* may be truly said, it is with regard to man daring to inquire into the first elements, which seem placed at an infinite distance from the sphere of our capacities. Nothing, perhaps, is more modest than the opinion of Newton, who went no farther than to apprehend that the elements of matter are matter; that is, an extended and impenetrable being, whose intimate nature the human intellect cannot penetrate; that God can divide it *ad infinitum*, as he can annihilate it; but keeps its parts extended and inseparable, as a basis to all the productions of the universe.

On the other hand, nothing, perhaps, can exceed the boldness of Leibnitz's flight, in setting out with his principle of a *sufficient reason*, to penetrate, if possible, into the very bosom of causes, and into the inexplicable na-

ture of those elements. All bodies, says he, are composed of extended parts : but of what are these extended parts composed ? They are, continues he, actually divisible, and divided *ad infinitum* ; thus extension is ever all you meet with. Now to say, that extension is the *sufficient reason* of extension, is arguing in a circle, it is saying nothing ; therefore the reason, the cause of extended beings must be sought for in beings which are not so, in simple beings, in monades ; thus, matter is nothing but an assemblage of simple beings. We have seen in the chapter of the soul, that, according to Leibnitz, every simple being is subject to change ; but its changes, its determinations, which it successively receives, cannot proceed from without, as this being is simple, intangible, and occupies no place ; it has then within itself the source of all its changes, produced by external objects ; it has therefore ideas. But it has a necessary relation to all the parts of the universe, it has therefore ideas relative to the whole universe. The elements of the vilest excrements therefore have an infinite number of ideas. Their ideas, indeed, are none of the clearest ; they are destitute of *Apperception*, as Leibnitz expresses himself ; they have not in themselves the inward testi-

mony of their thoughts, but they have confused perceptions of the present, the past, and the future. He admits four kinds of Monades.

I.

The elements of matter, which have no distinct thoughts.

II.

The Monades of beasts, which have some clear ideas, though none distinct.

III.

The Monades of finite spirits, which have confused, clear and distinct ideas.

IV.

Lastly, the Monade of God, with only adequate ideas.

I have already observed, that the English philosophers, with whom names go for nothing, have answered the premises only with ridicule; but it is by ratiocination alone that I must refute Leibnitz. Methinks I may take the liberty of saying to those who have countenanced such opinions, all the world agrees with you in the principle of *sufficient reason*; but is the consequence you draw from it here very just?

I.

You hold matter to be infinitely divisible, and yet the smallest part is not to be found; there is none which has not sides and figures,

and which does not fill a place; how then will you have it formed only of beings, without sides, place, or figure? Do you not trespass against the great principle of *contradiction*, in tenaciously following that of *sufficient reason*.

II.

Is it sufficiently reasonable that a compound should have nothing similar to that of which it is composed? Nothing similar, do I say? the difference is infinite between a simple and an extended being, and you will insist that one is made of the other! Would it be more offensive to reason to say, that several elements of iron form gold, and the constituent particles of sugar make coloquintida?

III.

Can you presume to affirm, that a drop of urine is an infinitude of Monades, and that each has ideas, though obscure ones, of the whole universe? and this because, according to you, there is a *plenum*, and because in this *plenum* every thing is conjoined, because every thing being conjoined, and a Monade having ideas necessarily, it cannot have a perception which does not relate to every thing in the world?

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Yet such are the things, in the explication of which lemmas, theorems, and corollarys have been drawn, and what have they proved? what Cicero said, 'that there is nothing so strange which has not been maintained by philosophers. O metaphysics! we are now just as far advanced as in the time of the first druids.

C H A P. X.

OF THE ACTIVE FORCE THAT GIVES MOTION
TO EVERY THING IN THE UNIVERSE.

*Whether there be always the same quantity of
force in the world. Examination of force.
Manner of calculating force. Conclusion of
both parties.*

I SUPPOSE it is agreed, that matter can have no motion of itself; it must therefore receive it from elsewhere; but it cannot receive it from other matter, as that would imply a contradiction: motion therefore must proceed from an immaterial cause. God is that immaterial cause. But here the utmost care must be taken, that this vulgar axiom, 'a philosopher must never have recourse to God,' has place only in things that may be explained by physical proximate causes. For instance, I am to explain why a four pound weight is counterpoised by a pound weight; if I say that God has appointed it should be so, I should betray my own ignorance; but I say, it is because the one pound weight is four

times farther from the centre of motion than the four pound weight. It is otherwise with regard to the first principles of things: in that case not to have recourse to God, is a mark of ignorance; for either there is no God, or no first principles but in God.

It is he that has impressed on the planets that force by which they move from west to east; it is he who caused the planets and the sun to revolve on their own axes. He has impressed a law on all bodies, by which they all equally tend to their centre. He has also formed animals, to whom he has given an active force, whereby they produce motion.

The great question is to know, whether this force or power given by God to begin motion, is, in nature, always the same.

Descartes, without making any mention of force, advanced, without the least proof, that there is always an equal quantity of motion; and his opinion was the worse founded, as he was an absolute stranger to the very laws of motion. Leibnitz, who lived in more enlightened times, has been obliged to acknowledge, in conformity to Newton, that motion diminishes; but at the same time pretended, that though the same quantity of motion does not subsist, the force is always the same. New-

ten, on the contrary, considered it as a contradiction to suppose, that the motion was not in proportion to the force.

Previous to any mechanical discussion of this subject, we must consider the nature of things; for here the geometrician must submit to follow the metaphysician. A man has a certain quantity of active force; but where was this force before his birth? If it be said that it resided in the germ of the foetus; of what consequence is a power that cannot be exerted? but when he is grown up to manhood, does he not enjoy a freedom of acting? cannot he exert more or less of this force? Suppose he exerts a force of three hundred pounds in moving a machine; I will suppose, as it is possible, the force is applied to a lever, and that the machine annexed to this lever, is in an exhausted receiver; the machine may easily acquire a force of two thousand pounds. The operation being finished, the arm withdrawn, the lever taken away, the weight without motion; I would ask, whether the little matter that remained in the receiver, had acquired, from the machine, a force of two thousand pounds? Do not all these considerations tend to shew, that the active force is continually

recruited and continually diminished in nature?

Let us now, to terminate this metaphysical dispute, listen to Newton and experiment. Motion, says that philosopher, is produced and lost; but from the tenacity of the fluids, and the little elasticity of the solids, the loss of motion in nature greatly exceeds the reproduction. This admitted, if we consider the following undoubted axiom, that the effect is always proportionable to the cause, it will follow, that where motion diminishes, there must also be a diminution of force. Therefore, if the same quantity of force be always in the universe, this maxim, that *the cause is proportionable to the effect*, can be no longer true.

It has been imagined that, in order to preserve in nature this equality of force, it was sufficient to alter the manner of estimating this force: thus, as Mersenne, Descartes, Newton, Mariotte, Varignon, *etc.* have always followed Archimedes, in measuring the force of a body, by multiplying its mass by its velocity; so the followers of Leibnitz, Bernoulli, Herman, Poleni, s'Gravesande, Wolf, *etc.* have multiplied the mass by the square of the velocity *.

* This dispute was begun between M. Huygens and

This dispute, to the scandal of geometry, has divided Europe; but appears at length to be, in reality, only a dispute about words. It is indeed impossible that these eminent philosophers, though absolutely opposite, can be mistaken in their calculations. Both are equally just; the mechanical effects answer equally to both methods of computation. There is then undoubtedly one sense in which they are all in the right. Now, that point where they all coincide, is that which should reconcile them; and this was first indicated by Dr. Clarke, in the following manner.

If you consider the time in which the moving body acts, its force at the end of this time, is as the square of the velocity multiplied by the mass. Why? because the space passed over by the body, is as the square of the time in which it is passed over. Now the time is as the velocity; therefore the body, which, in this time, has passed over this space, at the

the abbe *Catalan*, about the force of oscillating bodies, and continued some time between these two gentlemen; at last, another subject of a similar kind engaged the abbe, with the famous *Leibnitz*, who is to be considered as the first author, that plainly declared, in express words, that the force of bodies was as their masses multiplied by the square of the velocity.

end of this time, acts in proportion to the mass multiplied by the square of its velocity; thus when the body 2, passes in 2 times any spaces whatever, with 2 degrees of velocity, at the end of this time its force is 2, multiplied by the square of its velocity 2; which makes 8, and the body makes an impression as 8: in this case the followers of Leibnitz are not in the wrong. But the followers of Descartes and Newton united, are also right, when they consider the problem in another point of view; for they say, that in an equal time a body of four pounds with one degree of velocity, acts precisely as a pound weight with four degrees of velocity; and elastic bodies impinging on one another, recoil always in a reciprocal proportion of their mass and velocity; that is, if a ball of two pounds weight with one degree of velocity, and a ball of one pound with two degrees of velocity, be thrown against each other, they will arrive at the same time, and recoil to equal heights; therefore, not what happens to bodies in an unequal, but in equal times is to be considered; and hence arose the mistake. Therefore the new method of computing the force of bodies, is true in one sense and false in another; therefore it serves only to perplex and em-

barrafs a simple idea ; consequently the former method should be preferred. What then shall we conclude from these two methods of investigation ? only this, that the effect is always in proportion to the cause. Therefore, if any motion be lost to the universe, the force which is the cause of it will also of consequence be lost. Such were Newton's thoughts with regard to most questions relating to metaphysics : you may judge between him and Leibnitz.

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